



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,587	02/10/2005	Kazushi Wada	450100-04723	9868
7590 William S Frommer Frommer Lawrence & Haug 745 Fifth Avenue New York, NY 10151				
03/06/2008				
EXAMINER				
TRAN, THANH Y				
ART UNIT		PAPER NUMBER		
2892				
MAIL DATE		DELIVERY MODE		
03/06/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/521,587

Applicant(s)

WADA ET AL.

Examiner

THANH Y. TRAN

Art Unit

2892

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 12-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, and 6-11 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/14/08 has been entered.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4, 6-7, and 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Inagaki (U.S. 2003/0085399).

As to claim 1, Inagaki discloses in figures 3-5 a solid-state image pickup device including: a photosensor portion (“photoelectric conversion region” 8) having first and second opposite sides, the photosensor portion being provided on the surface of a substrate (5) to convert light incident on the first side into electric charges; a transfer portion (“electric charge transfer region” 14) formed on the surface of the substrate (5) to transfer the electric charges read out from the photosensor portion (“photoelectric conversion region” 8); and an overflow barrier (6) formed within the substrate (5) and opposite the second side of the photosensor portion

Art Unit: 2892

("photoelectric conversion region" 8) to discharge unnecessary electric charges of the electric charges, wherein potential under the transfer portion (14) (potential of 14 in d'/(d-d') section, figures 3 & 5) is formed smaller than that formed under the photosensor portion (8) (potential of 8 in c'/(c-c') section, figure 5) along the depth direction of the substrate (5) in a range from the minimum potential position to the overflow barrier (6) (see figures 3 & 5, and paragraphs [0042] & [0089]). It should be noted that: figure 5 shows photodiodes (including "photoelectric conversion region" 8) are formed in c-c' section which have higher potential than that formed in/under the transfer portion 14 (d-d' section).

As to claim 2, Inagaki discloses in figures 3-5 a solid-state image pickup device, wherein transfer portion ("electric charge transfer region" 14) has one impurity region (p-type impurity region 15) formed at its second side.

As to claim 3, Inagaki discloses in figures 3-5 a solid-state image pickup device, wherein the photosensor portion ("photoelectric conversion region" 8) has one impurity region ("p+" type of impurity region 9) formed at its second side.

As to claim 4, Inagaki discloses in figures 3-5 a solid-state image pickup device, wherein a second impurity region ("n- type semiconductor" 7, see paragraph [0040]) formed under the photosensor portion (8) are formed with depths different from that of the impurity region (9).

As to claim 6, Inagaki discloses in figures 3-5 a solid-state image pickup device, wherein the impurity region ("p+" type of impurity region 9) is a P type impurity region and the second impurity region ("n- type semiconductor" 7) is an N type impurity region.

As to claim 7, Inagaki discloses in figures 3-5 a solid-state image pickup device, wherein the potential in the overflow barrier (6) under the transfer portion ("electric charge transfer

Art Unit: 2892

region” 14) is smaller than that in the overflow barrier (6) under said photosensor portion (“photoelectric conversion region” 8) (see figures 3 & 5, and paragraphs [0042] & [0089]). It should be noted that: figure 5 shows photodiodes (including “photoelectric conversion region” 8) are formed in c-c’ section which have higher potential than that formed in/under the transfer portion 14 (d-d’ section). Thus the potential of the overflow barrier portion 6 corresponds to “photoelectric conversion region” 8 is higher than that formed in the overflow barrier portion 6 under the transfer portion 14.

As to claim 10, Inagaki discloses in figures 3-5 a solid-state image pickup device, further comprising a substrate is composed of a first substrate (5) and a second substrate (12) formed on an upper layer of first substrate (5) and which is higher in resistance than said first substrate (5), the first substrate (5) being of a first conductivity type (n type), and the second substrate (12) being of the second conductivity type (p+ type). Since region 12 is formed in region 7 which has a weak potential (see paragraph [0057]), this means the region 12 is higher in resistance than the substrate (5).

As to claim 11, Inagaki discloses in figures 3-5 a solid-state image pickup device, wherein said first conductivity type (n type) is N type and said second conductivity type is P type (p+ type 12).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki (U.S. 2003/0085399).

As to claims 8 and 9, Inagaki does not disclose a region of the overflow barrier under the photosensor portion has a concentration lower than that of a region in the overflow barrier under the transfer portion; and wherein the overflow barrier is formed at the position deeper than 3 μm from the surface of the substrate. However, providing a portion of overflow barrier under the photosensor portion which has a concentration lower than that of a region in the overflow barrier under the transfer portion; and forming an overflow barrier at the position deeper than 3 μm from the surface of the substrate would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the range giving unexpected results, it is not inventive to discover optimal or workable ranges by routine experimentation. In *re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). Furthermore, the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen

dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Allowable Subject Matter

5. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: “a solid-state image pickup device having potential under a transfer portion is formed smaller than that of a photosensor portion provided on the surface of the substrate, and an impurity region is arranged in four layers along the depth direction of the substrate and a second impurity region which is formed under the photosensor portion and is arranged in seven layers along the depth direction of the substrate”.

Response to Arguments

6. Applicant's arguments with respect to claims 1-4, and 6-11 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (571) 272-2110. The examiner can normally be reached on M-F (9-6:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le, can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/T. Y. T./
Examiner, Art Unit 2892

/Thao X Le/
Supervisory Patent Examiner, Art Unit 2892